From: bjhartzler@netins.net
Sent: Monday, June 12, 2006 9:58 AM
To: NOP Livestock
Subject: Please use the following for changes to Organic Regulations.

Scope of the ANPR

(1) Is the current role of pasture in the NOP regulations adequate for dairy livestock under principles of organic livestock management and production?

The belief is widely held in the organic dairy community that the current regulations are understandable and enforceable. The provisions in the rules requiring cattle to be raised promoting their natural instinctive behaviors, along with the requirement for access to pasture, a well-defined set of temporary exemptions, and in conjunction with the definition of pasture in the rules, result in a framework no less enforceable than many other aspects of this environmentally progressive set of standards. The NOSB, on a number of occasions, has concurred by recommending to the department the enactment of guidance statements that would help farmers and certifiers better understand the current requirements and to help the NOP enhance enforcement on a few dairies and certifiers that seemed to be "creating" loopholes in the regulatory language.

However, since there are operations certified for organic dairy production that provide anywhere from zero to an insignificant percentage of intake from pasture for their lactating cows, and the USDA has not acted, it is obvious that the current regulation is not adequate and is clearly not defined enough. The requirements for access to pasture are being enforced inconsistently by different

certification agencies, without correction through the accreditation process. Clarification of the requirements will allow for uniform enforcement and a level playing field for all producers. The NOSB adopted a set of principles in 2001 that states: ?The basis for organic livestock production is the development of a harmonious relationship between land, plants, and livestock, and respect for the physiological and behavioral needs of livestock.? These principles are not met in a system that restricts grazing ruminants to feedlots or supplies insignificant amounts of pasture intake.

(2) If the current role of pasture as it is described in the NOP regulations is not adequate, what factors should be considered to change the role of pasture within the NOP regulations. Provide any available evidence in support of concerns raised.

Minimum pasture intake should be required. Organic dairy livestock over 6 months of age must graze on pasture during the months of the year when pasture can provide edible forage. The grazed feed must provide significant intake, at minimum 30% of the dry matter intake during the growing season but for no less than 120 days per year. This provision must be for all cows, whether dry or lactating. Certifiers must carefully monitor pasture stocking rates to ensure that the definition of pasture stated in the regulations is maintained, thus safeguarding soil and water quality and animal health.

Some certified organic dairy operations are supplying zero to 5% DMI from pasture to their lactating cows (i.e. 3-5% pasture DMI noted by Aurora Organic Dairy, see NOP Pasture Symposium transcript on page 84, lines 13-18 at http://www.ams.usda.gov/nosb/transcripts/April2006/041906DairySymposium.pdf). This is far from sufficient to meet the expectations of the organic community as verified by several recent

consumer surveys and verified by the tens of thousands of comments--over 50,000 so far for this ANPR comment period in addition to thousands at previous NOSB meetings--via letters, signed petitions, and public testimony that the NOP / NOSB has received regarding the need for minimum pasture standards. (See below answers to ?Consumer Perceptions? questions for more specifics.) There is substantial scientific evidence showing the benefits pasture provides to soil health, livestock health, milk quality, energy usage, consumer confidence & assurance, and nutritional benefits. The November 17, 2005 NOSB Draft Recommendation on Pasture Requirements references numerous supporting studies and additional ones are cited at the end of this document.

(3) Which parts of the NOP regulations should be changed to address the role of pasture in organic livestock management? Pasture appears in the NOP definitions (subpart B, section 205.2), and in subpart C of production and handling requirements under livestock feed (section

205.237), livestock healthcare (section 205.238), and livestock living conditions (section 205.239). Should the organic system plan requirements (section 205.201) be changed to introduce a specific means to measure and evaluate compliance with pasture requirements for all producers of dairy or other livestock operations? Or, should a new standard be developed just for pasture alone?

Livestock operations will need to outline in detail their pasture system, including management, pasture acreages, animal numbers, and planned DMI intake, in their organic system plans. No additional changes are needed to 205.201 which already requires description of practices and procedures, adequate recordkeeping, and monitoring practices.

Changes to the regulation should be made as follows:

Subpart A - Definitions

Growing season for pasture. The time(s) of year when pasture growth is possible from natural precipitation or irrigation.

Dry matter intake (livestock feed). The quantity of total feed intake measured on a moisture-free basis in order to provide a consistent basis for comparison.

§ 205.237 Livestock feed.

(b) The producer of an organic operation must not:

(7) Prevent dairy animals from grazing pasture during lactation, except as allowed under §205.239(b).

(c) Ruminant livestock must graze pasture for the growing season but not less than 120 days per year. The grazed pasture must provide a significant portion of the total feed requirements but not less than 30% of the dry matter intake on an average daily basis during the growing season.

§ 205.239 Livestock living conditions.

(a) The producer of an organic livestock operation must establish and maintain livestock living conditions which accommodate the health and natural behavior of animals, including:

(1) Access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its stage of production life, the climate, and the environment;

(2) Access to pasture for ruminants, as required in 205.237(c).

(b) The producer of an organic livestock operation may provide temporary confinement for an animal because of:

(2) The animal?s stage of production life; for ruminants this includes only:

(i) birthing;

(ii) dairy animals up to 6 months of age; or

(iii) beef animals during a final finishing stage not to exceed 90 days.

Consumer Preferences

Are there market-based or other types of research to substantiate an expectation by consumers that organic milk comes from dairy cows raised on pasture?

A survey of 1,011 of U.S. adults commissioned by the Center for Food Safety (CFS) found that six out of ten women who buy organic milk and five out of ten of all organic milk purchasers would no longer do so if they knew that many organic cows were confined to fenced-in feedlots and did not graze on pasture for most of their lives. More than two-thirds of all consumers and 75% of women in a Consumers Union (CU) survey of 1,485 U.S. online adults said that the national organic standards should require that animals graze outdoors. When asked specifically in the CU survey if they would still pay a premium price for organic milk that came from cows that were confined indoors and did not graze outdoors (have access to

pasture), only 14% agreed that they would (60% disagreed, while 25% remained neutral).

Whole Foods Market, Inc Fl@avors email newsletter survey to their customers asked ?When choosing organic milk, cheese and other dairy products, what is important to you about the conditions in which the organic dairy cattle are raised? Check all that apply.? The highest rated condition was ?Most of their food is from pasture? with the second being ?Spend more time outdoors than indoors?. 18,455 responses were received from April 12-13, 2006.

Commissioned by the USDA for the Pasture Symposium, the Natural Marketing Institute (NMI) surveyed 1000 online adults and found that 72% noted animals grazing in pasture being a concern. When super heavy organic dairy users were broken out, 81% regarded pasture a concern, versus 79% of heavy users, and 55% of light users. When NMI Solutions? survey results were converted by regression analysis (according to Investorwords.com regression analysis is ?A statistical technique used to find relationships between variables for the purpose of predicting future values) the following values resulted: No antibiotics-100, Organic feed-98.4 (and pasture is an organic feed), No hormones-83.7, From animals that graze in a pasture-83.3, and Humane treatment-43.4.

A survey commissioned by USDA by the California Institute For Rural Studies of 1000 randomly selected consumers (Strohlic, 2005) found that second to high price, the next reason consumers do not buy organic foods is due to lack of confidence about the organic seal (46.4%). The survey found that consumers are not very well educated about the USDA program (only 37% were aware of the National Organic Standards). It is likely the revelation that dairy animals are not required to graze on pasture could damage confidence further. Strohlic concludes, ?Nevertheless, mistrust of organic claims is high and efforts to uphold the integrity of the organic standards must be maintained in order to foster continued and increased consumer confidence.?

The fact that most all the cartons of organic milk show images of cows on pasture, regardless of whether their cows actually graze, illustrates that the marketers know full well that cows on pasture is the expectation of organic dairy consumers.

Is there evidence, data, or other types of research that the role of pasture as it exists in the regulations does not support consumers' beliefs about the relationship between organic milk and organic dairy cows?

The USDA has suggested current ?access to pasture? wording is too nebulous and thus allows an extremely minimal intake of pasture (see NOP Pasture Symposium transcripts as noted above) and in the interpretation of some certifiers, allows lactating cows to be kept off pasture during the growing season. The Whole Foods Survey, cited above, showed that the highest consumer rated condition about how organic cows are raised is ?Most of their food is from pasture?. A DMI intake of 0 to 5% is certainly nowhere near meeting this consumer expectation. In the CU survey, 60% of the organic dairy consumers said they would no longer pay a premium price for organic milk if it did not come from cows that graze outdoors and the CFS survey found that half of consumers would no longer buy organic milk if organic cows did not graze on pasture for most of their lives.

Access to Pasture

Is there evidence in dairy or animal science literature that supports an appropriate minimum amount of time that dairy cows (or other ruminant animals) should be kept on pasture?

Nature intended ruminants to spend all their time on pasture. It has been human intervention that contrived

the unnatural situation for livestock, especially dairy cows, to be kept off pasture and in artificial, human created environments?breeding animals that excelled in high-production/confinement management and on highly processed stored feedstuffs. Nature would assert that ruminants should certainly be on pasture during the full growing season and beyond, when the environmental conditions allow pasture growth, either with natural precipitation or irrigation if rainfall is inadequate.
Most organic producers have pasture systems in place which allow them to continue grazing their livestock for a considerable time period after pasture growth has ceased by stockpiling growth and by having adequate acreage in their systems. 120 days should be established as the shortest amount of grazing days allowable?anything less is just too brief to be considered adequate to provide enough of the natural environment for ruminants.

By requiring ruminants to be on pasture, cows are in their natural environment where they can walk and lay on soft, cushiony ground; harvest food that provides nutritional factors that are lost with machine harvest; and have access to fresh air, sunlight, and freedom to express natural behaviors. Most organic dairy producers have set up their milking systems in such a way that the cows are milked quickly and efficiently and sent out on fresh pasture after each milking. In situations like these, the cows are on pasture for 18 or more hours a day.

Is there evidence in dairy or animal science literature that supports a minimum amount of feed that should come from pasture?

Again, nature intends for the dairy cow?s entire intake to be from pasture (and supported by NOP regulations calling for livestock to be managed to ?accommodate the health and natural behavior of animals?). There are dairy operations

in this country that rely solely on pasture during the growing season and there are a multitude of farms in New Zealand who do as well, many relying on pasture year round to supply 100% of the cow?s intake, other than perhaps salt and some minerals. Studies done by Tilak Dihman at Utah State University show that there is a linear relationship between pasture intake and levels of beneficial fatty acids in milk and meat?the more pasture intake, the higher the levels of beneficial fatty acids like CLA and omega 3 (Dhiman, T.R., et al. 1999. "Conjugated Linoleic Acid Content of Milk from Cows Fed Different Diets." Journal of Dairy Science 82:2146-2156).

While science suggests that 100% pasture intake would give the consumers the most nutritional benefit and is the most natural instinct and environment of the dairy cow, the consensus among organic dairy producers (NODPA, MODPA, WODPA, CROPP Cooperative, Humboldt Creamery, Michigan Organic Dairy Producers, Organic Choice, DMS Advisory Committee) and the vast majority of the organic community is that 30% dry matter intake should be the very minimum amount of pasture intake during the growing season. Most organic dairy producers will supply much more pasture intake than this minimum level.

Like other aspects of the NOP regulations, the 30% figure is not science based. It is the byproduct of a long collaboration between stakeholders in the organic dairy community which resulted in the near consensus of support for the proposed benchmarks and was a compromise from higher proposed DMI levels initially discussed, as is the current practice on most organic farms.

Should age and reproductive cycle of the animal be taken into account in determining the minimum amount of time an animal spends on pasture or the amount of feed derived from pasture?

While it is natural for all ages of ruminants to be on pasture, and many operations do have all their dairy animals from calves on up on pasture, the consensus of producers is supportive of the NOSB recommendation to allow exemption from pasture for dairy youngstock under 6 months of age. Other than a temporary exemption for the process of birthing (which can also take place most successfully on pasture but in some cases may require human assistance), there should be no exemption from pasture for any other part of the production or reproductive cycles.

Ruminant Animal Nutrition

What is the appropriate contribution of pasture to ruminant animal nutrition?

In an ideal world, ruminants should be receiving most if not all of their nutrition from pasture during the growing season. Some producers are moving towards a system where the concentrates fed per cow is just a few pounds of grain a day or no grain at all. Asking for a minimum benchmark of 30% dry matter from edible pasture is a very reasonable request and has been agreed upon by producers across the United States.

What would the effect be to require a minimum dry matter intake (DMI) of 30 percent derived from pasture?

There would be no effect on the vast majority of organic livestock farms as they are already meeting or exceeding 30% DMI. Those few that aren?t meeting the requirement will need to either put more land into a pasture system or if their animal numbers are too high for their land base, they would need to break their herd up into smaller units so there would be a balance between numbers of animals and land available for grazing. An extensive number of economic studies are cited in the Appendix to this document that show that the economics of a grazing farm are as good as, and in most cases better than, confinement operations, so the long term economic health of the farm should be neutral, if not increased.

Is this an achievable goal?

Yes, it?s being demonstrated country wide on farms from Colorado to Maine to Idaho to California, as well as more than being met in foreign countries from Denmark to New Zealand to many others.

What evidence is available to support 30 percent as a benchmark?

It is the byproduct of a collaborative effort including dairy producers in all regions of this country, with support from major consumer groups. It is a compromise from the higher DMI levels initially proposed during farmer discussions. A poll of organic dairy producers, conducted last year by The Cornucopia Institute, and submitted in formal testimony before the NOSB, found that 86% organic dairy producers in the United States currently meet or exceed the 120 day/30% DMI benchmarks. An additional 7% said that they would have to make minor

modifications to their operation and were willing to do so. Just 1% indicated that they objected to the benchmarks.

The 30% is a number just like all the other numerical parameters in the NOP Rule--a number has to be picked that makes good, practical sense, but may be somewhat arbitrary as are the following regulation numbers:

Sodium nitrate restricted to no more than 20% of a crop?s total nitrogen requirement.
Compost: C:N ratios between 25:1 and 40:1; temperature to be maintained between 131F and 170F for 3 days for in-vessel or static aerated pile or 15 days for a window system during which the material must be turned a minimum of 5 times.
36 months with no prohibited substances for land prior to organic certification
90 days milk withhold after use of Ivermectin
7 day withholding of milk after use of lidocaine and procaine for dairy animals, 90 day withholding for slaughter stock
90-120 days after application of raw manure before harvest of an organic crop
95% organic content for ?organic ? labeling

What factors could affect a minimum DMI variable?

The amount of pasture allocated, the quality of the pasture in terms of stage of maturity, plant species, the density of the stand, how much food the animal ate in the barn or at the feed bunk before being put out to pasture, the time spent on pasture, how often fresh pasture is offered?these are all factors under the management control of the farmer and can be managed to optimize dry matter intake.

Does pasture quality affect DMI?

Absolutely--if unpalatable species are provided in the pasture, if the growth is over mature, if there is too little regrowth or if the density of the stand is very low so that little intake is achieved with each bite, there will be reduced dry matter intake. Again, these factors, however, are all under the control of the farmer. Organic farmers are paid a premium, in part, because of increased demands on management.

Can DMI be affected by factors beyond producers' control, such as weather-related events (e.g., flood or drought)?

Yes, drought or flood can affect DMI by reducing the amount of pasture regrowth in terms of drought or availability in terms of flood. If these are typical events for a farm, then they need to be considered and planned for in the operation?s organic system plan. For example, if some pastures are in a flood plain that is often under water, that farm will need to ensure that there are other pastures available to cover those times. If an operation is in an arid area, they will need to provide for irrigation of pasture, just as irrigation has to be provided to grow mechanically harvested crops like alfalfa and corn. If drought or flood is rare, then they could be managed by the temporary exemption allowed in 205.239(b). This period of time would be documented in the Organic System Plan and in records maintained by the operation.

Is it useful to establish a single benchmark or measure, such as minimum DMI, for all dairy operations in the United States and all foreign organic operations who want

to be certified to the NOP standard?

Yes, it would be most useful to establish a minimum benchmark. Creating a measurable minimum DMI requirement from pasture that is clear, consistent and enforceable will ensure that dairy animals are being managed in a way intended for the production of organic milk. A minimum benchmark requirement is needed to assure consumers that organic livestock products are at the very least achieving a minimum level of DMI from pasture. Producers will have a wide range, from 30% to 100% DMI, above the minimum level to express their own management desires and goals.

Please provide input on how the regulations should address forage nutritional quality factors such as crude protein, acid detergent fiber, neutral detergent fiber and net energy for lactation? Is this level of detail adequate to ensure the role of pasture is met for organic livestock management under the NOP regulations?

This level of detail and oversight would be beyond the scope of certification. There is no current quality requirement in the regulation for stored feed and it should be no different for pasture. It is in the best interest of producers to ensure that the pasture is providing quality feed for their livestock, as is the case with stored feed. For some producers, there will be a learning curve, just as there is a learning curve in other parts of organic production.

Minimum Pasture Requirements

Please provide input on the implications of adopting a minimum pasture requirement, such as required that dairy animals should spend at least 120 days on pasture.

The rule needs to be written such that ruminants (except for the exceptions granted by the NOSB) are grazing pasture for the full growing season, but not less than 120 days per year. This would mean that an operation in central New York State would be grazing for at least 180 days at minimum of 30% DMI; in Missouri it might be well over 200 days, some areas in western Oregon might have close to a 300 day growing season, in northern Minnesota it may only be 120 days?the minimum. A farm in northern British Columbia that only had a 90 day growing season could not qualify for USDA organic certification. Dairy cows (as well as other organic ruminants) need to be on pasture for the FULL growing season, whatever it is in each area, but it must be at least 120 days long.

Requiring 120 days on pasture alone is not sufficient to clarify pasture for ruminants. Given the experience of these years since the NOP rules have been in place, it is very clear that the only way to ensure significant pasture intake, which is clearly the expectation of organic consumers, is for there to be a minimum level of pasture intake required. 120 days doesn't guarantee anything other than that cows set foot on pasture for 120 days out of the year. If the cows filled up on feeds at the bunk or manger before going out to pasture and / or if the pasture does not happen to be very palatable or of extensive amount and / or if the cows are only out on pasture for a few hours a day instead of all day and all night except when in the barn for milking--then there will likely be very minimal pasture intake.

How would the 120 days be counted?

Farmers will need to keep a record of the total number of days per calendar year the cows are on pasture. When an operation is in a short growing season area that will be close to only achieving the 120 day minimum on pasture, each day that livestock are on pasture can be counted as part of the minimum 120 days as long as the pasture intake is high enough to keep the average DMI intake above 30%.

What evidence in dairy science or animal literature helps explain the appropriate amount of minimum time that dairy cows should be kept on pasture?

Again, nature intended that 100% of a ruminant?s time be spent on pasture. The minimum 120 days on pasture is based on the shortest pasture growing season in areas that have a history of being substantial dairy production areas.

Is the minimum time spent on pasture based primarily on the quality of the pasture, or the quantity of the feed provided by the pasture?

It is based on the time period when pasture can grow given rainfall or irrigation, if natural precipitation is inadequate to promote plant growth, which would impact quantity of feed provided from pasture. Pasture quality is determined by farmer management.

How is the pasture requirement affected by drought, flood, or other natural disaster?

The NOP rules allow an exemption for temporary confinement due to inclement weather or risk to soil or water quality. This should give the certifiers some flexibility if areas or farms experience unusual natural disasters, floods, or droughts and can?t meet the minimum requirements in an especially abnormal year. But areas where drought or flood is typical need to take this into account when they are building their organic system plan, and make provision to be able to meet the requirements even when in the face of drought or flooding, if they are typical of the location.

Should pasture condition or quality be considered?

Certification / inspectors must carefully monitor pastures to ensure that the definition of pasture stated in the current regulations is maintained, safeguarding soil and water quality and animal health, and not be compromised by too high a stocking rate or poor pasture management. This should already be covered in Rule via the definition of pasture.

Should there be a minimum pasture quality requirement?

No, that should be left up to the management of each producer. There is a wealth of information and technical support for farms wanting to learn more about grazing management to improve the pasture quality. There is no current quality requirement in the regulation for stored feed so it should be no different for pasture.

Should specific animal-unit stocking rates per acre be considered? How?

Although stocking rate would be an easy benchmark to use, unfortunately it is too variable from farm to farm, season to season, and even within different pastures and soil types on an individual farm, to use it as a broad measure. The only valid use would be to establish a maximum stocking rate of 3 cows per acre but only when used in conjunction with meeting a minimum DMI first.

In lieu of a uniform pasture requirement, could a time range (based on the field quality, number of cows, type of operation, and other farm-specific factors included in the organic system plan) adequately or appropriately define the role of pasture in organic livestock management?

What is meant by ?time range? based on the noted factors is unclear. There must be a uniform minimum measurable level of grazing required to ensure that a significant portion of the total feed requirement is from pasture. Calculation of dry matter intake is a standardized method for comparing feed value of different feed stuffs, and is widely used. We are not aware of any ?time range? formulas that incorporate numerous variables as mentioned that would provide a similar basis for comparison.

Should a livestock feed requirement uniformly specify how much feed comes from pasture?

If the question means should there be an annual intake amount, such as 10% annual intake from pasture, the answer

is no. A minimum DMI intake from pasture for the growing season should be established and operations should be using the full growing season of each geographic area, from the short 120 day growing season areas (i.e. northern MN & ME) to those areas that can a achieve a year round or near year round DMI from pasture (i.e. northern CA, New Zealand). A uniform annual pasture requirement would allow minimization of pasture intake in longer growing season areas. Pasture intake should be optimized as much as possible and an annual intake amount would undermine that goal stated by the NOSB.

If the question means should there be only one level of pasture intake, no, there should never be an upper limit put on pasture intake, only a uniform minimum floor. Producers are welcome to feed more than the minimum requirement ? and most of them do.

Measurement, Enforcement, and Compliance

How would an accredited certifying agent appropriately measure compliance with specific measures adopted to change the role of pasture? For example, if dry matter intake is used as a benchmark, should it be measured as the average DMI over a certain time period, such as a calendar year or average 12 months?

It should be measured either as DMI per animal per day or can be calculated as an average over the full growing season, but not over a calendar year. If the DMI is measured as an average over the growing season, then there may be some days in that average where intake will be less than 30%, compensated by days when it is over 30%. This

will give flexibility needed to monitor a natural system. A farmer could keep records that indicate the feeding plans per day or week, and indicate when days occur that are over or under the 30% DMI intake level. The certification agent can spot check records over the growing season to verify daily compliance, and check season averages if average daily intake is low at times.

How should producers and certifying agents verify compliance over time for a herd of cows that are at various stages of growth or have varying states of nutritional needs?

A simple calculation sheet can be created that producers can use to determine the measurable amount of dry matter needed per average cow per day (24-hour period) for the growing season (120-day minimum time). It would not be necessary to work down to an individual cow level. The DMI measurement can be calculated by the back-calculation method--what the farmer was feeding the cows in the non-grazing season compared to what the farmer is feeding the cows in the growing season to supplement the pasture. The difference between the two would be the average DMI per animal per day for each group of animals. The producer will be able to document when the livestock were put on pasture for the season and when the cows were taken off pasture, or the date when the pasture was no longer providing 30% or more of the daily DMI. Again, this can be indicated with an increased amount of supplementation in the producer records.

Can the producer and certifying agent determine this in the organic system plan?

The plan can and should be laid out in the operation?s

organic system plan but compliance must be verified through the annual certification process such as annual reports of dates animals are on pasture, inspection of pastures for feed value, and annual feed records that are already a part of organic certification.

Market and Other Impacts

What are the effects on a dairy operation's cost of production (both fixed and variable) if the regulation is amended to include requirements such as minimum time or minimum amount of feed derived from pasture?

There are some initial capital costs of installing fencing and purchasing water line and water tanks when going to a grazing system, but much of it can be done very cheaply?with internal fencing provided by temporary step in posts and one strand of aluminum or polywire.

The savings in operating costs quickly outstrip the investment needed. This has been confirmed by numerous studies comparing grazing and non-grazing herds. 36 studies are listed in the appendix of this document, most all showing higher net income on grazing farms and lower veterinary and medicine cost than on non-grazing farms (studies from OH, CA, VT, WI, VA, NY, MI, PA, MO, and MA).

The NOP Standards have been in effect since 2002, and grazing was clearly a requirement for ruminants at that time. Any operations that now have to make additional investments to come into compliance will be adjusting to a more level playing field for all producers, making up for what should have been in place by 2003.

Is there a relationship between the number of cows and number of acres on a farm and the producer's ability to comply with minimum pasture requirements?

Definitely, the number of animals on an operation needs to be in balance with the number of acres available for grazing. To be out of balance is to not be in tune with the definition of organic production of ?integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity?. Nor would being out of balance, in terms of stocking levels, be in compliance with the NOP pasture definition. Some farms may have to allocate some land from crop production to pasture use, which will still be providing the feed needed for the herd, but in a cow harvested form rather than mechanically harvested and delivered manner. Some large industrialized operations will have to split up their multi-thousand cow herds into smaller units, and develop more pasture appropriately located near the milking facilities, to achieve the necessary balance between land and animals, or reduce overall herd size.

How do the age of the animal, its stage of development, and feed from pasture, interact to affect milk output?

The typical milk output of a cow increases from initial freshening, often around two years of age, to reach a peak beginning around 5 years of age. High levels of milk production, over 20,000 lbs. per cow, have been maintained even with extensive amounts of pasture intake. The level of milk production depends on the pasture, herd, supplemental feed management, goals of the farmer and the genetics of the cows. In general, the dairy industry

recognizes and plans for the impact that pasture has on milk production when they take into account the increase in milk production during the ?spring flush?.

How would a larger role for pasture affect supplies of organic and non-organic milk and milk products? Please provide any evidence or research to support your discussion.

The National Organic Program needs to clarify the pasture requirements. This is clear because the loose definition has allowed certain certifiers and certain operations to allow for pasture availability that is below the expectations of a large percentage of the consumers purchasing organic milk products. Upholding the standards is of utmost importance. Its influence on the supply of organic milk should not be a concern to the NOP. Producers need to comply with the standards?it is simple as that. Without clear standards and high integrity within the organic production plan, consumer confidence will be lost and the market will feel the impact much more than any slump due to learning curves or system changes that need to take place.

It?s possible that it could reduce the speed with which the supply of organic milk meets the demand because industrial confinement farms will not qualify for conversion to organic production without making substantial alterations to the layout of their operations. However, the flip side is that a large portion of consumers are clear that they expect a substantial role for pasture in organic dairy production. According to a recent Center for Food Safety survey, 50% of the consumers surveyed said that they would no longer buy organic milk if it did not come from cows that graze on pasture for most of their lives. If clear rules requiring a minimum pasture intake are not put in place, there is a real

chance for reduced market place growth and demand for organic dairy products. It is far better to keep the confidence of the consumer and let the supply grow at perhaps a slower rate than to compromise the consumer expectation (in order to grow the supply faster) but end up hurting long term market demand.

As to how a larger role for pasture might affect supplies of non-organic milk, it seems that question is beyond the interest and scope of this ANPR which is concerned with organic milk.

What are the effects on consumer prices for dairy products if the NOP regulations include a larger role for pasture on dairy livestock producers?

There should not be any change as most organic dairy producers are already meeting and exceeding 30% DMI for the growing season. A poll of organic dairy producers conducted last year by The Cornucopia Institute found that 86% organic dairy producers in the United States currently meet or exceed the 120 day/30% DMI benchmarks. An additional 7% said that they would have to make minor modifications to their operation and were willing to do so. Just 1% indicated that they objected to the benchmarks.

Consumers already assume that there are strong pasture requirements. Clarifying the NOP regulations to require that a minimum amount of forage dry matter intake on a per cow per day basis comes from edible pasture during the growing season, but at least 120 days per year, will strengthen the NOP and validate consumer perception.

How would a larger role for pasture affect the geographical distribution of organic dairy production operations within the United States and foreign countries? Please provide any evidence or research to support your discussion.

There already are organic herds in states like Colorado, Idaho, California, and Texas that meet and exceed the 30% DMI for the growing season. Other farms in such areas can follow the lead of these farmers on how to set up and manage an operation to achieve the minimums.

As far as foreign countries are concerned, it is important to remember that this is a United States program. The National Organic Program, while part of the AMS because no one in the USDA was quite sure where to put it, represents more than just a marketing program. The NOP defines a method of production even more so than a marketing program, and as such must have standards differentiating organic agriculture from conventional production norms. Namely, the NOP must ensure that practices and inputs are truly sustainable, non-detrimental to humans, animals, and the environment, and, indeed, beneficial to the Earth. While foreign countries may be looked to for guidance on rule-making, the USDA cannot tailor the law to accommodate any foreign production practice or the needs of any foreign entity. The OFPA was written for US farmers, processors, and consumers, and the NOP must reflect that intent.

However, other big dairy countries that would likely be exporting organic dairy products into the U.S. market, such as New Zealand and Ireland, do already more than meet the suggested minimum grazing standards as a standard practice on all farms, whether conventional or organic. European countries have pasture requirements as part of

their organic standards. For example, the Danish regulation reads "All animals shall, in the period from 15th April to 1st November, have access to grazing a minimum of 150 days. Exceptions are animals in their first weeks of life where they can be kept indoors and slaughter pigs after weaning and bulls older than 1 year. Calves younger than 4 month old can be kept indoors. Calves between 4 and 6 month old must have access to pasture in the period from May 1st to September 1st when weather permits". (Translation from Danish to English provided by Torben W. Bennedsgaard, DVM, PhD with the Danish Institute of Agricultural Science)

European Union Organic Standards include the following:
4.7. Rearing systems for herbivores are to be based on maximum use of pasturage according to the availability of pastures in the different periods of the year.

8.3.1. Subject to the provisions in paragraph 5.3., all mammals must have access to pasturage or an open-air exercise area or an open-air run which may be partially covered, and they must be able to use those areas whenever the physiological condition of the animal, the weather condition and the state of the ground permit, unless there are Community or national requirements relating to specific animal health problems that prevent this. Herbivores, must have access to pasturage whenever conditions allow.

8.3.4. By way of derogation from paragraph 8.3.1., the final fattening phase of cattle pigs and sheep for meat production may take place indoors, provided that this indoors period does not exceed one fifth of their lifetime and in any case for a maximum period of three months.

Annex VII: Maximum number of animal per ha (hectare) is 2 for dairy cows (.8/cows per acre). This is based on maximum number of animal per ha equivalent to 170kg N/ha/year. (Stocking density is based on manure produced.)

Additional Notes relating to the Pasture ANPR

Some Western crop growers have expressed a concern that implementing a minimum pasture requirement may put them out of business. There would still be up to 70% of the ration during the growing season and 100% of the ration during the non-grazing season that will be able to be provided by stored feeds that these farmers are growing. As more farms transition, there will be increased demand from new clients for the organic feeds that they produce. It must be remembered that organic production calls for a balance between land and animals and if all the feedstuffs are being brought in from operations apart from the dairy operations, then there is little if any balance between the livestock and the land that is supporting them for recycling of manure, etc.

Some inaccuracies are noted in the text of the ANPR, specifically:

ANPR quote from page 10 in reference to the NOSB approved pasture guidance document: ?But many other organic dairy farmers provided comments that did not support the NOSB guidance. These commenters said that although they were organic farmers in compliance with the NOP regulations and that they supported the principles of organic management and production, they would be decertified under the

minimum number of days required on pasture or the minimum amount of dry matter intake (DMI) required from pasture for livestock feed.?

No comments from producers could be found stating that they would be decertified under the 30% / 120 days. From the comments submitted to the NOP referenced in the above ANPR quote (http://www.ams.usda.gov/nosb/PublicComments/Feb05/AccessToPasture.html):

44 specified as organic dairy farmers were in support of the 30% / 120 days
3 were against the 30%, 120 days and NRCS reference?Aurora Organic Dairy, Case Vander Eyk (CA), and Jerry Wolf (WI)
4 organic dairy farmers commented against the 30% 120 days--Gerald & Paul Klinkner, WI, Dave Engel, WI, and Strauss Family Creamery, CA There were several comments from farmers in Dave Engel?s survey summary but none of them stated that they would be decertified either. (Note: all the farmer comments in the Engel survey were anonymous). Case Vader Eyk did give a hypothetical situation in his letter of a farm being decertified but it was not based on an actual existing farm. He also surmised that with implementing the 30% / 120 day requirement that ?a significant number of organic dairy farmers in the Western States would be out of compliance and, therefore forced out of business? but he did not provide any factual data nor specify whether that would even be the case on his own farm or not. Aurora Organic Dairy conjectured that ?many, if not most U.S. organic dairy producers will have difficulty meeting the requirement for 30% for not less than 120 days.? That assertion is not backed up by the vast majority of comments received from organic dairy producers or by the Cornucopia Institute study.

ANPR quote on page 11: "One certifying agent said that at least half of their responding livestock operations, most with fewer than 50 dairy cows, would not be able to meet the guidance criteria put forth by the NOSB despite

meeting all other NOP requirements."

The only comment that this seems to possibly be referring to is Dave Engel's submitted written comment for the Feb 2005 comment period http://www.ams.usda.gov/nosb/PublicComments/Feb05/PastureAccessRecComments/EngelD.pdf which included results of a survey he had done. His comments there do talk about herd size in his survey respondents, saying "farms ranged in size from 12 cows to 450 cows. Only 30 herds were over 50 cows, and of those 30 only 8 were over 100. The average herd size of all 99 respondents was 58 cows. The average herd size without the 8 larger herds was 44 cows." However, the second part of the ANPR statement saying that "at least half of their responding livestock operations would not be able to meet the guidance criteria put forth by the NOSB" is not an accurate reflection of what Mr. Engel stated. He did not state that the 42.5% (and not ?at least half?) can't meet the requirement, but rather that they "could not or do not meet or have reservations about meeting the numbers." So the percentage who could not meet the 30% /120 day requirement is less than 42.5% as some just don't want to make the changes to meet it or have reservations or questions about things like what happens if there is drought, too much rain, etc. What percentage can't meet it is not stated.

Dave Engel's oral public comment: The survey that we did at MOSA of 290 dairy farmers at that time last April, just this past April, we had a 36% response rate, and of those 36 percent who responded, about 44 percent indicated concerns with the number. Now, that wasn't necessarily that they couldn't do it. Some could not. Most probably could if they were forced to,?.

Appendix: Studies in Addition to the 36 Cited in the 11/17/2005 NOSB Draft Recommendation on Pasture Requirements for Ruminants

Economic comparisons between grazing and non-grazing

1. Butler, L.J. and Gerry Cohn. 1993. "The Economics of New Technologies in Dairying: BGH vs. Rotational Grazing," in William C. Liebhardt (ed.), The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies (pp. 189-246). Davis, CA: University of California Sustainable Agriculture Research and Education Program.

The authors compare the hypothetical profitability of two dairy technologies, BGH and MIRG. The main point is that in the former, gross revenues rise as do costs, while in the latter milk production falls but so do costs. On a per-cow basis, net revenue is shown to be the same, but on a per-cwt. basis MIRG has a $0.44 advantage. They also explore the effects of changes in milk prices, milk production, interest rates, feed costs, and government policies on the profitability of the two systems.

2. Carr, S.B., et al. 1994. "Results of Intensive, Rotational Grazing on a Virginia Dairy Farm." Journal of Dairy Science 77(11):3478.

This is an abstract from an ADSA meeting. A dairy farm converted to MIRG. Daily milk production and milk fat content both fell. Herd health increased. Cost of purchased feeds fell by more than half. Net cash income increased by 43%. Even more impressively, net income minus depreciation increased by 70%, and net income adjusted for inventory changes increased by 227%.

3. Conneman, George, et al. 1997. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1996." Cornell University. Ithaca, NY.
A basic comparison of the profitability and the factors that seem to affect it for 30 grazing farms in NY. Factors investigated include percentage of forage coming from pasture, grain fed to cows, and frequency of rotations. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($11.29 vs. $11.84). Net farm income was much higher on grazing farms ($31,876 vs. $24,607). Report contains extensive data tables.

4. Conneman, George, et al. 1998. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1997." Cornell University. Ithaca, NY.
Identical in form to study #18, but updated for 1998. Economic analysis is carried out on 35 grazing farms in NY. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($11.08 vs. $11.90). Net farm income was much higher on grazing farms ($19,705 vs. $9,502). Report contains extensive data tables.

5. Conneman, George, et al. 1999. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1998." Cornell University. Ithaca, NY.
A continuation of reports #18 & 19, now updated for 1999. Economic analysis is carried out on 31 grazing farms in NY. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($10.53 vs. $11.26). Net farm income was much higher on grazing farms ($58,373 vs. $45,390). Report contains extensive data tables.

6. Conneman, George, et al. 2000. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1999." Cornell University. Ithaca, NY.

A continuation of reports #18, 19, & 20, now updated for 2000. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($10.53 vs. $10.73). Net farm income was lower on grazing farms for the first time in four years ($42,858 vs. $43,135). Report contains extensive data tables.

7. Hoard's Dairyman. 2003. "Save Money by Grazing Your Heifers." Hoard's Dairyman 148(3):96.
144 dairy heifers were split into two grazing groups and two feedlot groups. Grazing heifers gained slightly more weight. More significantly, total costs for grazing heifers was $0.95 per cow per day, versus $1.49 for feedlot heifers - an advantage of $0.54 per head per day.

8. Dartt, Barbara and James Lloyd. 1998. A Comparison of Management-Intensive Grazing and Conventionally Managed Michigan Dairies: Profitability, Economic Efficiencies, Quality of Life, and Management Priorities. Unpublished thesis. Department of Agricultural Economics, Michigan State University. East Lansing, MI.
This study compared 18 conventional dairies to 35 MIRG farms through surveys. Though asset levels were similar, grazing farms were 7% more profitable and 11% more capital efficient. Furthermore, grazing farms were 26% more "operating efficient" and 32% more "labor efficient." Both groups indicated a similar satisfaction with quality of life, though it was found that spouses from grazing farms took a more active role in the farm.

9. Dartt, B.A., et al. 1999. "A comparison of profitability and economic efficiencies between management-intensive grazing and conventionally managed dairies in Michigan." Journal of Dairy Science 82:2412-2420.
A comparison of 35 grazing and 18 conventional dairies in MI. Grazing dairies proved to be more profitable than conventional dairies, exhibiting superior asset use, operational practices, and labor efficiencies. However, the confined geographic region of this study makes extrapolation to other regions very tenuous.

10. Emmick, Darrell L. and Letitia F. Toomer. 1991. "The

Economic Impact of Intensive Grazing Management on Fifteen Dairy Farms in New York State." Forage and Grassland Conference. American Forage and Grassland Council.
Based on a study initiated by the Soil Conservation Service in 1989 of fifteen dairy farms in New York, the authors conclude that a more intensive use of pasture on many New York dairy farms could reduce input costs and enhance overall profitability, with the exception of large dairy operations or farms where there is an insufficient amount of pasture. On average, farms in the study which had switched to grazing saved $153 per cow per year compared to their operations prior to conversion.

11. Ford, Steve. 1996. "Grazing Looks Better as Dairy Profits Tighten." Farm Economics. Cooperative Extension, Pennsylvania State University College of Agricultural Sciences. University Park, PA.
Writing at a time of depressed prices for dairy farmers, the author argues that as feed costs increase and milk prices decline, grazing is a more and more attractive option. He cites several bits of data to illustrate grazing's advantage, including 1) daily ration costs of confinement vs. grazing as grain prices rise and 2) breakeven yields for alfalfa and corn relative to grass pasture.

12. Gloy, B.A., L.W. Tauer and W. Knoblauch. 2002. "Profitability of Grazing Versus Mechanical Forage Harvesting on New York Dairy Farms." Journal of Dairy Science 85:2215-2222.
Financial data from 237 nongrazing and 57 grazing farms in NY were compared using a regression analysis. Profitability between and among the two systems ranged widely and overlapped, though in general grazing systems were shown to be at least as profitable as nongrazing systems. Three factors have the strongest impact on profitability for graziers: herd size, milk production per cow, and milk prices.

13. Hanson, Gregory D. 1995. "Adoption of Intensive Grazing Systems." Journal of Extension 33(4).
Production and financial data were obtained from a random stratified sample of 50 grazing farmers in PA. One

interesting finding was that these farms were actually practicing moderate intensive grazing, not fully intensive grazing. Because of reduced costs, net returns to grazing were more than double those to a corn silage system and more than six times those to a hay operation. The article concludes by discussing the challenges facing Extension agents in disseminating grazing information to farmers.

14. Hanson, Gregory D., et al. 1998. "Profitability of Moderate Intensive Grazing of Dairy Cows in the Northeast." Journal of Dairy Science 81:821-829.
Grazing dairies were compared to non- or partially-grazing dairies through USDA survey data. Though non-grazing dairies showed much higher gross farm incomes, grazing dairies showed higher returns per cow and net farm income, using fewer cows. Results of a survey of 50 PA graziers are also discussed.

15. Kliebenstein, James B., Carrol L. Kirtley and Lloyd A. Selby. 1983. "A Survey of Swine Production Health Problems a. Kliebenstein, James B., Carrol L. Kirtley and Lloyd A. Selby. 1983. "A Survey of Swine Production Health Problems nd Health Maintenance Expenditures." Preventive Veterinary Medicine 1(4):357-369.
170 pork producers in MO reported disease and death information in a 1978-79 survey. Looking at expenditures for veterinary services, the pasture producers had the lowest overall costs. The average veterinary cost per animals for pastured pigs was less than half the average cost for confined pigs.

16. Kole, Glenn, et al. 1992. "Utilizing Controlled Grazing on Dairy Farms in Northern Michigan." Forage and Grassland Conference. American Forage and Grassland Council.
The authors report on the reduction in production costs of four farms in Northern Michigan that converted from conventional methods to controlled grazing. The range of savings on the four farms was $8200-15,000 in real dollars. Average savings across all four farms was $2/cwt. The text also mentions briefly the social and emotional benefits of controlled grazing for the farm family.

17. Kriegl, Thomas. 2000. "Wisconsin Grazing Dairy Profitability Analysis: Preliminary Fourth Year Summary." University of Wisconsin Center for Dairy Profitability. Madison, WI.
45 graziers in WI provided financial data, and comparisons are made between graziers and confinement operations. It is found that MIRG is an economically competitive system, that it is more economically flexible than a confinement system, and that it is not necessarily a reduced management system, but rather a different management system.

18. Kriegl, Thomas. 2001. "Wisconsin Grazing Dairy Profitability Analysis: Preliminary Fifth Year Summary." University of Wisconsin Center for Dairy Profitability. Madison, WI.
This report is a continuation of a longitudinal study (see #33), with a fifth year of data added. Again 45 grazing farms provided financial data. The conclusions drawn the year before are merely strengthened here: MIRG is an economically competitive and flexible system. It is also found that, on the whole, graziers have higher net income per cow and lower debt per cow than confinement farms.

19. Kriegl, Thomas. 2002. "Fact Sheet #5: Grazing vs. Confinement Farms." Regional Multi-State Interpretation of Small Farm Financial Data from the First Year Report on 2000 Great Lakes Grazing Network Grazing Dairy Data. University of Wisconsin Center for Dairy Profitability. Madision, WI.
This is a factsheet based on a larger report (study #3) that specifically points out the comparisons between graziers and confinement dairies in WI and NY. Net incomes per cow for grazier vs. confinement are $617 vs. $296 in WI and $315 vs. $181 in NY. Net incomes per cwt. are: $3.44 vs. $1.20 in WI and $1.38 vs. $0.65 in NY.

20. Kriegl, Thomas. 2004. "Fact Sheet #5: Grazing vs. Confinement Farms - Year 3." Regional Multi-State Interpretation of Small Farm Financial Data from the Third Year Report on 2002 Great Lakes Grazing Network Grazing Dairy Data. University of Wisconsin Center for Dairy Profitability. Madision, WI.

This is a factsheet based on a larger report (study #4) that specifically points out the comparisons between graziers and confinement dairies in WI and NY. Net incomes per cow for grazier vs. confinement are $651 vs. $641 in WI and $786 vs. $672 in NY. Net incomes per cwt. are $3.14 vs. $2.36 in WI and $2.86 vs. $2.34 in NY.

21. Kriegl, Thomas and Gary Frank. 2004. "An Eight Year Economic Look at Wisconsin Dairy Systems." University of Wisconsin Center for Dairy Profitability. Madison, WI.
Based on eight years of data, this is a comparison of net income per cwt. for three kinds of WI dairy farms: grazing, traditional confinement (50-75 cows), and large modern confinement (>250 cows). Under three different cost scenarios, MIRG farms consistently show the highest net incomes. When all operating costs are taken into account, grazing returned an average of $3.96/cwt. over 8 years; traditional confinement $2.39/cwt.; and large modern confinement $1.50/cwt.

22. Liebhardt, William C. 1993. "Farmer Experience with Rotational Grazing: A Case Study Approach," in William C. Liebhardt (ed.), The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies (pp. 131-188). Davis, CA: University of California Sustainable Agriculture Research and Education Program.
The author presents in exhaustive detail the results of 12 case studies of dairy farms from 5 different states, plus the results of several other academic studies. Time after time, with tables of data to illustrate, the same theme is presented: feed costs are lower, labor demands are lower, milk production is sometimes lower, and profit is higher on grazing dairies than on confinement dairies.

23. Moore, K. C. and J. R. Gerrish. 1995. "Economics of Grazing Systems Versus Row Crop Enterprises." Forage and Grassland Conference. American Forage and Grassland Council.
The authors state that research in Missouri and Iowa has shown that net returns can be substantially improved under rotational grazing, and income will more than cover the costs of developing the necessary infrastructure, especially on erosive marginal land with poor crop yields.

Using enterprise budgets, they compare the economics of beef production across a 3-year average for 3 intensities of grazing: 3-, 12-, and 24-paddock systems. Returns above cost per acre are $77, $104, and $109, respectively.

24. Mowrey, Coleen M., Carl E. Polan and Gordon E. Groover. 2000. "Can Grazing be Profitable?" Hoard's Dairyman 145(16):627.
The authors relate the results of five different studies in NY, PA, WI, and VA, each of which illustrates the same general phenomenon: despite lowered milk yields and lower gross incomes, grazing farms consistently bring higher profits per cow or higher returns to labor due to reduced input and labor costs. Even when grazing farms brought lower net incomes, they still brought greater returns to labor due to smaller assets.

25. Murphy, William M. and John R. Kunkel. 1993. "Sustainable Agriculture: Controlled Grazing vs. Confinement Feeding of Dairy Cows," in William C. Liebhardt (ed.), The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies (pp. 113-130). Davis, CA: University of California Sustainable Agriculture Research and Education Program.
This chapter lays out three main criteria for "sustainable agriculture" -- profitability, quality of life, and positive rural landscape -- and then argues that MIRG satisfies the criteria better than confinement dairying. Topics are illustrated with case studies, and include: increased profitability, lowered costs and labor requirements, better herd health, higher quality of life for the farmer, reduced erosion on farmland, and more farmers farming.

26. Murphy, William M., John R. Rice and David T. Dugdale. 1986. "Dairy farm feeding and income effects of using Voisin grazing management of permanent pastures." American Journal of Alternative Agriculture 1(4):147-152.
An introduction to the Voisin grazing system is given. Forage samples were taken and dairy profitability measured on six VT grazing farms. On 3 farms where comparison was possible, net profits per cow were $67 more using MIRG than using continuous grazing the year before, due mainly

to savings on feed costs.

27. Nichols, Matt and Wayne Knoblauch. 1996. "Graziers and Nongraziers Fared About the Same." Hoard's Dairyman 141(9):351.
Selected elements of costs and profits were compared between a set of grazing and non-grazing farms in NY. When 15 graziers were matched up with 15 similar non-graziers and examined over 3 years, milk production was consistently lower but net farm income consistently higher for graziers. When those 15 graziers were compared to a non-matched group of 79 non-graziers, both milk production and net farm income were higher for graziers.

28. Noyes, T. E., M. L. Bennette and D. J. Breech. 1997. "Economic Survey of Management Intensive Grazing Dairies in Northeast Ohio." Forage and Grassland Conference. American Forage and Grassland Council.
The authors find that although Ohio farms using MIRG have lower gross income than non-grazing farms, they also have a higher net income due to the savings in cost of production. Net return per cow on MIRG farms was $447 and $468 for 1994 and 1995, respectively. By comparison, net return per cow for all dairy farms (including MIRG) was $400 and $429.

29. Olsen, Jim. 2004. "A Summary of Basic Costs and Their Impact on Confinement vs. Managed Intensive Rotational Grazing (MIRG)." Wisconsin Dairy Data. University of Wisconsin Center for Dairy Profitability. No. 2004-01. Madison, WI.
3 years of data on costs of production are compared between confinement and MIRG farms. MIRG farms featured significant cost savings in a number of categories, including Renting/Leasing ($87/head/yr); Other Livestock Expenses ($82/hd/yr); Depreciation of Purchased Breeding Livestock ($65/hd/yr); Purchased Feed Costs ($45/hd/yr); and Veterinary Expenses ($43/hd/yr). Overall, the MIRG farms held a $476/head/yr advantage in costs of production.

30. Rust, J.W., et al. 1995. "Intensive Rotational Grazing for Dairy Cattle Feeding." American Journal of Alternative

Agriculture 10(4):147-151.
Two groups of cows were either grazed (+ small supplementation) or confined over 2 years. Measurements of animal performance, forage quality, and profitability were taken. Confinement cows produced 7% more milk. Grazed cows produced a net return $53 and $44 greater than confinement cows in the 2 different years. Greatest cost economies resulted from reduced use of facilities and equipment and reduced labor.

31. Soriano, F.D., C.E. Polan and C.N. Miller. 2001. "Supplementing Pasture to Lactating Holsteins Fed a Total Mixed Ration Diet." Journal of Dairy Science 84:2460-2468.
Cows were fed either TMR only, TMR+morning pasture, or TMR+afternoon pasture. Milk production was slightly higher with TMR cows. No significant differences were detected for milk fat, protein content, or body weight, but body condition was greater for TMR cows. Income-over-feed costs were 18.6% higher than TMR for afternoon grazing and 7.5% higher than TMR for morning grazing.

32. White, S.L., et al. 2002. "Milk Production and Economic Measures in Confinement or Pasture Systems Using Seasonally Calved Holstein and Jersey cows." Journal of Dairy Science 85:95-104.
A four-year study comparing milk production and economic profitability of confinement and pastured herds. Pastured cows produced 11% less milk, but feed costs for pastured herds averaged $0.95 less per cow per day. Significantly more confinement cows got mastitis and were culled. Overall, the tradeoff between milk yields and economic factors showed pasture-based systems to be economically competitive with confinement systems.

33. Winsten, Jon, et al. 1995. "Economics of Feeding Dairy Cows on Well-Managed Pastures." University of Vermont. http://pss.uvm.edu/vtcrops/?Page=research/pasture/Economics.html.
23 VT graziers in 1994 and 21 in 1995 were compared to 24 VT confinement farms which comprised the top quarter for per-cow profitability of farms using the Agrifax accounting system. Graziers earned $579 net income per cow over 2 years, while confinement farms averaged $451 per cow. Biggest savings occured in the areas of paid labor,

cropping costs, repairs, and fuel.

34. Winsten, Jonathan R., Robert L. Parsons and Gregory D. Hanson. 2000. "A Profitability Analysis of Dairy Feeding Systems in the Northeast." Agricultural and Resource Economics Review 29(2):220-228.
Data was obtained from a stratified random sample of 96 dairy farms in three categories: confinement, traditional grazing, and MIRG. Confinement farms had the highest milk production and milk sales, but also the highest grain expenses and veterinary expenses per cow. There were no significant differences in machinery use. Overall, confinement farms had the highest rate of return to assets (7.76%), followed by MIRG (5.83%). Traditional grazing lagged far behind.

35. Winsten, Jonathan R. and Bryan T. Petrucci. 2003. "Seasonal Dairy Grazing: A Viable Alternative for the 21st Century." American Farmland Trust.
The report begins by providing a good introduction to the many purported benefits of grazing, including environmental, farm labor, and farm profitability. Then case studies of six farms in four states (WI, MA, MI, PA) are presented, concentrating on farmers' histories with grazing, paddock construction, feeding practices, yields, and profitability. The farms usually achieve net incomes per unit well above their state averages, even when herd size or milk per cow is substantially lower than average.

36. Zartman, D.L. (ed.). 1994. "Intensive Grazing/Seasonal Dairying: The Mahoning County Dairy Program." Department of Dairy Science, Ohio Agricultural Research and Development Center. OARDC Research Bulletin 1190. Wooster, OH.
This is an exhaustive report on many elements of a 5-year grazing project conducted to assess the viability of MIRG for Ohio dairies. Consists of 12 chapters, mostly agronomy- and animal science-related. Milk production increased each year. Costs of production were found to be 27-30% below those used in conventional OH dairy budgets. Net farm income was also higher than the national dairy farm average in the year when the project sold Grade A milk.

Studies on animal and human health related to grazing

37. Bruun, J., A.K. Ersboll and L. Alban, 2002. Risk Factors for Metritis in Danich Dairy Cows. Preventive Veterinary Medicine, Volume 54, pp. 179-190.

2144 herds from 3 regions in Denmark, totally 102,060 cows. The risk for metritis was lower for cows in herds with grazing relative to cows in zero-grazing herds or in herds when cows grazed only when dry.

38. Clancy, Kate. Greener Pastures, How grass-fed beef and milk contribute to healthy eating. Union of Concerned Scientists, March 2006
http://www.ucsusa.org/food_and_environment/sustainable_food/greener-pastures.html

A comprehensive study that confirms that beef and milk from animals raised entirely on pasture have higher levels than conventionally raised beef and dairy cattle of beneficial fats that may prevent heart disease and strengthen the immune system. The study also shows that grass-fed meat is often leaner than most supermarket beef, and raising cattle on grass can reduce water pollution and the risk of antibiotic-resistant diseases.

39. Dhiman, T.R., et al. 1999. "Conjugated Linoleic Acid Content of Milk from Cows Fed Different Diets." Journal of Dairy Science 82:2146-2156.
This clinical trial consisted of four different experiments, each feeding a group of cows a different kind of diet. Examples include high oil diets, fish meal mixed with monensin, pasture + TMR, all pasture, and finely chopped alfalfa. Cows with all pasture and no supplements had 500% more CLA in their milk fat than cows on typical

dairy diets.

40. Frankena, K., E. N. Stassen, J.P.T.M.Noordhuizen, J.O. Goelema, J. Schipper, H. Smelt, H. Romkema. Prevalence of lameness and risk indicators for dermatitis interdigitalis during pasturing and housing of dairy cattle. In: Thursfield, M.V. (Ed.), Proc. Annual Symp, Soc. Vet. Epidemiol. Prev. Med., London, pp. 107-118.

Reported effects of grazing included less severe hoof disorders and recovery from such disorders.

41. Nocek, James E., Hoof Health: Managing Cow Comfort to Reduce Lameness. Biovance technology, Omaha, NE, 2000.

Author makes recommendations for feedbunk design based on the natural behaviors or the cow and what is best for cow comfort. ?When observed in her natural habitat, the cow had been adapted to eating in a natural grazing position, as in pasture. Studies have shown that cows will eat longer and produce more saliva during the eating process when they are consuming food in a grazing vs. a more horizontal position.? It is a natural behavior to graze, which in turn produces more saliva, which aids in rumination.

42.G. M. Jones, Professor of Dairy Science, Extension Dairy Scientist. Milk Quality and Milking Management Proper Dry Cow Management Critical for Mastitis Control. Virginia Tech, Virginia Cooperative Extension. Publication Number 404-212, posted May 1999
Pasture has reduced the risk of environmental mastitis, but ? pastures should be managed to prevent muddy areas where heifers or older cows would lie down, as exposure is increased when cows have access to lots with limited shade trees, or pastures that are overgrazed, or grazed during periods of heavy rain.

43. Keil, N.M., T.U. Wiederkehr, K. Friedli and B. Wexchsler, 2005 (in press). Effects of Frequency and Duration of Outdoor Exercise on the Prevalence of Hock Lesions in Tied Swish Dairy Cows. Preventive Veterinary Medicine.

Exercise of long duration is generally associated with low prevalence of hock lesions, whereas frequent exercise of short duration is associated with high prevalence of lesions. ?Having the cows remain outdoors for long periods of time is only possible in the case of pasture where cows move about while grazing and are also able to lie comfortably. By contrast, short periods of exercise include all occasions of being in the outdoor run where cows mainly stand and normally do not lie down due to the limited space and the inappropriate surface (mostly concrete or dirt surface, or rarely, wood shavings.?

44. Strohlic, Ron. 2005 "Regulating Organic: Impacts of the National Organic Standards on Consumer Awareness and Organic Consumption Patterns" California Institute for Rural Studies (CIRS).
http://www.cirsinc.org/docs/Regulating_Organic.pdf

45. C.C. Ketelaar-de Lauwere, et. al. Voluntary automatic milking in combination with grazing of dairy cows. Milking frequency and effects on behaviour. Applied Animal Behaviour Science, February 10,1999.

Cows spend 80-99.6% of their time lying when they have they have access to pasture. Lying time is a indicator of cow comfort and health. Findings support improved animal welfare. When cows had choice between indoors and outdoors, they spent most of their lying time in pasture.

?Grazing seems to be advantageous for the welfare of the cows, as they clearly preferred to lie in the pasture rather than in the cubicles.?

46.Murray, R.D., D.Y. Downham, M.J. Clarkson, W.B. Faull, J.W. Hughes, F.J. Manson, J.B. Merritt, W.B. Russell, J.E. Sutherst and W. R. Ward. Epidemiology of Lameness in Dairy Cattle: Descpription and Analysis of Foot Lesions. Veterinary Record 1996, Volume 138, pp. 586-591.

Study of 5000 dairy cattle found that the incidence of hoof lesions was lower for cows on grass. The incidence of hoof lesions was lower in summer when cows were grazing on pasture than it was during the winter months when cows were housed indoors.

47.C.S. Poulson, T.R Dhiman, A. L. Ure, d. Cornforth, K.C. Olson. Conjugated linoleic acid content of beef from cattle fed diets containing high grains, CLA, or raised on forages. Utah State University. Livestock Production Science 91 (2004) 117-128

The concentration of C 18:2 cis-9, trans-11 isomer of CLA in beef can be raised by as much as 466% by feeding forages and pasture only compared with beef from animals fed typical high-grain diets.

48.Wells, S.J., L.P. Garber and B.A. Wagner, 1999. Papillomatous Digital Dermatitis and Associated Risk Factors in US Dairy Herds. Preventive Veterinary Medicine. Volume 38, pp. 11-24.

Cows housed on dyrlots versus those on pasture were three times more likely to develop papillomatuous. The incidence of papillomatuous digital dermatitis among lactating cows housed only in drylots was 36.6% versus 10.7% for cows housed in pasture. Cows housed in pasture and drylot had a 21% incidence of PDD.

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